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ECONOMIC IMPACTS OF THE 1988 FIRES IN THE GREATER YELLOWSTONE AREA: ECONOMICS OF MULTIPLE-USE MANAGEMENT ON PUBLIC FOREST LANDS

JULY 28, 1992

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July 28, 1992

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Dear Erv:

Enclosed is a copy of the final project report for Agreement Number INT-90498-RJVA titled "Economic Impacts of the 1988 Fires in the Greater Yellowstone Area: Economics of Multiple-Use Management on Public Forest Lands."

Sincerely,

Paul E. Polzin
Director

PEP:ds

cc: Terri Lerch, UM Controller's Office

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Intermountain
Research Station

Research Paper
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June 1992

Economic Impacts of the 1988 Yellowstone National Park Fires

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RESEARCH SUMMARY

1988 forest fires in and around Yellowstone National Park burned thousands of acres and affected thousands of lives. In the aftermath of the Fire, the U.S. Congress appropriated several millions of dollars to study both the biological and economic implications of the Fires. This report, which focuses on the economic impacts of the Fires, results from one of those studies.

Communities in immediate proximity to Yellowstone National Park (e.g., Gardiner and West Yellowstone) were the primary focus of this study, although other nearby communities (e.g., Cody) were assessed as well. Economic factors causing impacts were changes in tourist expenditures and payments made by firefighting organizations (known as "ADO" payments) to local businesses and individuals. The economic impact of the Fires was specified as the difference between economic conditions "with" the Fires versus what was expected "without" the Fires.

Information on past tourism indicate that Yellowstone National Park was headed for a record year in 1988..... ..... this is to be continued for another 20 lines of results...

CONTENTS

INTRODUCTION 6

METHODS 7
- General Approach 7
  - Geographical Scope 9
  - Industry Classifications 10
  - Timeframe 11
- Employment and Wages Descriptions 12
- Analytical Framework 14
- Tourism Related Effects 15
- Actual Effect of ADO Payments on Area Industries 19
- Wages and Salary Coefficient 22
- Multipliers 22

RESULTS 23
- Description Of Study Area And Communities 24
- Tourism Expenditures and Recreation 26
  - Actual Effect Of Tourist Expenditures On Tourism Industries 26
  - Projected Effect Of Tourist Expenditures On Tourism Industries 30
  - Net Effect Of Tourist Expenditures On Tourism Industries 31
- Ado Payments 32
- Employment And Wages 33
- Integrating Study Results 35
  - Direct Effect Of Wages And Salary On Local Industries 36
  - Total Effect Of 1988 Fires Of Wages And Salaries On Local Economies 36

DISCUSSION 37

LITERATURE CITED 41

APPENDICES 43

INTRODUCTION

The forest fires that ravaged Yellowstone National Park in 1988 began on July ? and were declared extinguished on October ? (Cite 1988). ???? acres and untold thousands of lives were impacted. But the ecological and economic impacts that began in the summer of 1988 did not end that autumn. Some say the ecological impacts will be felt for a hundred years. While the economic impacts will not be discernible for that long, they probably lasted longer than the Fire.

The merchants and persons living and working in and around Yellowstone National Park bore the brunt of the economic burden from the Fires. Visitation records from Yellowstone National Park early in the year indicated that 1988 year was to be a banner, if not a record, year. The fire prevented that. But serious questions regarding economic consequences remain. What are the short and long term effects of visitation to Yellowstone due to the Fire? Some researchers have suggested that visitation rates will continue to be high for two or three years after the Fires because of curiosity seeking, but eventually the rates will go back down to a steady pre-fire rate (Phillips 1988; Snepenger 1988). Because each year since 1989 has had a record number of visitors to Yellowstone National Park, the Fire may have had at least a short term effect of increasing visitation to the Park. It is unknown though what the visitation would have been if the Fire never occurred. The level of visitation occurring recently may be due to curiosity seeking (Yuan and Yuan 1989).

Rarely does such a catastrophic event lend itself to an in-depth study and analysis. During mid-October of 1988, a group of 130 researchers met at Montana State University "to assess the research needs and to begin to develop a comprehensive, long-term research plan to study the effects of fires that burned portions of the Greater Yellowstone area during the summer of 1988" (Schmidtt 1988). That meeting resulted in: (1) creation of a Greater Yellowstone Fire Impact and Recovery Research Consortium (referred to as the FIRE Consortium) to facilitate research on the effects of the Fires in a wide range of disciplines; and (2) development of a research agenda. Two of the socio-economic research studies proposed focused on economic impacts: (1) to describe the

probable economic effects of the Fire on adjacent communities, and (2) to assess long-term local economic effects varying with the number and composition of visitation.

During the fall of 1989, the U.S. Congress appropriated $400,000 for research related to the 1988 Yellowstone Fires. One of these studies was to deal with the economic impacts. In late 1989, the Forest Service's Intermountain Research Station issued a request for proposals to conduct economic impact research, as well as more ecologically-based research. By early spring 1990, the proposal submitted jointly by the University of Montana's Bureau of Business and Economic Research along with the University's Institute for Tourism and Recreation Research was selected. A formal research agreement was signed by the University and the Research Station. Study objectives were to assess the economic impacts on affected communities of the 1988 fires in and around Yellowstone National Park, comparing the 1988 fire year and a post-fire year to a pre-fire year baseline; "impacts" included both positive and negative effects on employment and earnings in affected industries and the total economy; "affected communities" include and distinguish between primarily-affected and secondarily-affected communities. The following reports on that study.

METHODS

However easy it is to speculate about the economic impacts of the 1988 Yellowstone Fires, it is wholly another matter to actually develop defensible, objective estimates of those impacts. We now discuss some general notions that guided our research efforts. This is followed by a description of limitations in geographical scope, industry classifications, and timeframe. Next we present an analytical framework within which this study took place. Then we discus the major elements of the framework--tourism expenditures, ADO payments, and employment and wages.

General Approach

A distinction should be made between two types of economic analyses that could be applied to the 1988 Yellowstone Fires--cost/benefit and impact. These studies are different, both in terms of "why" and "how" to do the study. A cost/benefit study assesses the value of the resources

burned-up and used to extinguish the Fires relative to the value of the benefits obtained. A benefit-cost analysis typically measures net revenue, return on investment, and the like. An economic impact study, on the other hand, assesses the distribution of consequences in terms of people affected. An impact study typically measures changes in jobs and income in local economies. This study used the economic impact approach to analyze the effects of the 1988 Yellowstone Fires.

The overriding research method used in this impact study was a "with and without" analysis. That is, we attempted to measure what would have happened to local communities "without" the 1988 fires. Since we knew what actually happened "with" the Fires, the difference in these two situations can be attributed to the Fires. Unlike descriptive approaches, the "with and without" approach is more complex because it requires projection of circumstances and events that did not occur.

We also used a "cause-and-effect" approach to assess economic impact. The "cause" of economic impact are changes in tourist expenditures and ADO payments associated with the 1988 Yellowstone Fires. Tourist expenditures refer to those purchases associated with tourists visiting Yellowstone National Park--food and drink, hotels and motels, and a host of other recreation-related items. ADO payments refer to payments made by Assistant Disbursement Officers, government administrative officials authorized to make payments for on-site expenditures related to fire control activities. Changes in these expenditures were treated as the stimulus for economic change. Changes in wages and salaries (and employment) for persons working in tourism-dependent industries were assumed to be caused by the expenditure stimulus.

Several types of fire-related expenditures were not included in our cause-and-effect analysis. First, we did not include most expenditures associated with fire-fighting supplies and equipment. Though these items are normally consumed or expended in the local fire vicinity, their associated expenditures are normally made outside the impacted area. For example, aircraft fuel used by slurry bombers may have affected the economies of Missoula, Montana or Boise, Idaho, but not the local areas surrounding Yellowstone National Park. Second, we did not include most wages and salaries paid fire fighters. Those persons are typically sequestered in camps and staging

areas, lacking routine contact with the local economy. A preliminary study concluded that there were few local expenditures for fire fighting supplies and equipment and that fire fighting crews spent little in the local areas. Third, we did not include, as expenditures, the value of fire-related tort claims. Torts are private or civil wrongs, independent of a contract, involving a legal duty to perform in a particular manner. A tort claim might involve damages to private property caused by the Fire. Approximately 180 claims totaling $37 million were filed as a result of the 1988 fires, about $24 million of which applied to the 1988 Yellowstone Fires (Ramos, 1991). Tort claims are only now beginning to be settled. And forth, we did not assess economic impact implications of environmental damages (such as washed-out bridges or stream siltation), their assessment being infeasible given the resources available to this study.

The concepts of direct and indirect economic impacts play a critical role in impact analysis. In the case of this study, direct effects receive the most attention. Direct effects refer to the impact (employment, wages and salary, or some other measure of impact) on those industrial sectors dealing directly with tourists, those sectors to whom tourist expenditures are directly made. Direct effects can be positive or negative. Indirect effects refer to the subsequent rounds of spending in the local economy by persons in sectors directly affected by tourist expenditures. Direct and indirect effects combine to depict the total effect of a particular stimulus on a local economy. Total effects are calculated as a multiple (with a multiplier) of direct effects.

Geographical Scope

In assessing the economic impacts of the 1988 fires, we concentrated on the communities immediately adjacent to Yellowstone National Park. We call them the Yellowstone Fire Impact Area. Farther away areas were also affected by purchases made in communities thoughout the country and by fire fighters returning home with wages. We refer to these as the secondarily-affected communities. Once again, most of our attention was devoted to the communities in the Yellowstone Fire Impact Area

As shown in Figure 1, the Yellowstone Fire Impact Area consists of a combination of counties and communities. Entire counties are used in Wyoming and Idaho--Teton and Park counties, Wyoming, along with Teton and Fremont counties, Idaho. The dominant community, usually the county seat, was identified for each county.

In Montana, the community was the spatial unit of analysis for travel expenditures, ADO payments, and income or employment. Specifically, the ZIP codes corresponding to West Yellowstone, Gardiner, and Cooke City-Silvergate. West Yellowstone is an incorporated city, while Gardiner and Cooke City-Silvergate are unincorporated. As shown in Figure 1, each of these communities is immediately adjacent to Yellowstone National Park. None were the dominant community in their county nor the county seat; consequently, they cannot be accurately described or analyzed by using countrywide totals or averages.

In Wyoming, slightly different spatial aggregates were utilized, depending on whether traveler expenditures, ADO payments, or income and employment were analyzed. These differences resulted from using existing data and information collected for other purposes. For traveler expenditure, separate data were derived for purchases made inside Yellowstone National Park (regardless of county) and for the non-Park portions of both Park and Teton counties. For ADO payments and income or employment information, separate data were developed for both Park and Teton counties, whether the payment occurred inside or outside the National Park boundary.

Industry Classifications

In order to provide a consistent framework for analyzing the economic activity associated with the Yellowstone fires, we utilized the Standard Industrial Classification (SIC) codes (OMB 1987). The SIC codes are the industrial classification system developed by the U.S. Government which underlie economic data (such as employment and income) for industries. The code covers the entire field of legal, commercial activities. Government agencies assign each firm a SIC code, depending on the type of good or service produced by the firm. A firm producing more than one

good or service, is generally assigned to the industry accounting for most of the firm's revenue. The SIC classification system identifies industries in terms of a hierarchically-arranged numerical code, the most detailed being a four-digit number. Industrial aggregation consists of summing four-digit industries into more general three- or two-digit categories.

Most SIC industries correspond to easily identified economic activities. The travel industry, however, is not so easily defined. Tourists patronize firms in a number of different SIC categories, including grocery stores in retail trade, lodging places in services, and travel agents in transportation. To further complicate matters, many firms catering to tourists also serve local residents. We defined the tourist industry as consisting of three SIC industries:

--SIC 58 for Eating and Drinking Places;

--Selected miscellaneous retail, including SIC 5912 (Drug stores), SIC 5941 (Sporting Goods Stores), SIC 5941 (Book Stores), and SIC 5947 (Gift & Souvenir Stores);

--SIC 70 for Lodging Places.

This definition is not perfect, but expenditure surveys indicate that most tourist expenditures are in these categories (Cite 19??).

Timeframe

The overall timeframe for this study was 1987 through 1991, although analyses concentrate on three years--1987 to 1989. Partial information available for 1990 and 1991, and these data were used to provide supplemental descriptions in some cases. Over the 1987 to 1989 period, the pre-fire year of 1987 was used as the base; 1988 was the year of the Fire; and 1989 provided for the post-fire evaluation.

Most study calculations and analyses focused on the summer tourists season, July to September, defined as "third-quarter." This part of the year was emphasized because: (1) it reduced the "background noise" of events unrelated to the Fire; and (2) it provided comparability between tourist expenditure data, ADO payment data, and information on wages and employment.

Preliminary research concluded that many important trends were hidden when annual (twelve month) data were analyzed. Annual economic activity data does not necessarily reflect what happened in the Park as a result of the Fires, because area visitation was not altogether dependent on events at Yellowstone Park. For example, the ski industry in Jackson, Wyoming contributes a substantial proportion of the overall annual economic base to that area. If a "no-snow" year produced a bad ski season in the area, the number of skiers at the Jackson area resorts would be substantially reduced. Poor business activity during the ski season would cause the level of business activity for the overall year to fall below a longterm average. The use of third-quarter data in the analysis better focused on those events that were directly attributed to the Yellowstone fires.

Third-quarter data also better reflect the seasonality of use in Yellowstone National Park than do annual data. Analysis of Yellowstone travel characteristics during 1988 and 1990 showed that visitation occurs almost exclusively when the Park's roads are open (about 97 percent) (Yuan and McCool 1988, 1989). Roads into the Park usually close in late October and do not reopen until late May. Nonthird-quarter use in the Park accounted for only 15 percent of total annual visitation in 1987, 17 percent in 1988, 15 percent in 1989 and 16 percent in 1990 (NPS 1990). Except for West Yellowstone, winter season tourism in other affected communities may not be due to Yellowstone Park acting as an attractor (Moisey and McCool 1989). The Park's nonthird-quarter visitation varied by about 2 percent of the total during the study period and thus did not significantly affect the communities' overall annual economy.

Employment and Wages Descriptions

The size, structure, and related characteristics of local economies are usually analyzed with population, income, and employment data. Population, income, and employment totals totals provide a rough measure of the relative size of the economies, while the structure of the local economy may be described using information for specific industries. For example, if one community has twice the employment of another community, its economy is also about twice as

large. Similarly, if an industry accounts for relatively more employment in one area as compared to another, its contribution to the local economy is also greater.

The communities in the Yellowstone Fire Impact Area could not be analyzed in the traditional fashion because they are a combination of counties, cities, and unincorporated places. Data for income and employment are published only for counties. Information of communities, cities, or subcounty area are not generally available. Even Census of Population data, which provides once a decade benchmarks for communities and other subcounty areas, are not useful in evaluating the Yellowstone Fire Impact Area because they refer to conditions as of April 1 for the Census Year. This date may not reflect conditions during the rest of the year, especially in tourist oriented economies with summer and winter peaks.

Impact area communities were analyzed using special employment and wage tabulations because the published data for the Wyoming and Idaho counties were not sufficiently detailed. The Wyoming Department of Employment provided the data for Park and Teton counties (Wyoming 1991), while the Idaho Department of Employment supplied the figures for Teton and Fremont counties (Idaho 19??).

For the Montana communities of West Yellowstone, Gardiner, and Cooke City-Silvergate, employment and wage summaries were constructed from firm level records for Gallatin and Park counties provided by the Montana Department of Labor and Industry. The summary for each community were was constructed in several steps. First, the county wide files were searched and the firms with ZIP codes in the three communities were marked. Second, onsite visits, telephone inquiries, and other methods were used to identify additional firms doing business in the three communities but with nonlocal mailing addresses. Finally, multiunit employers were examined and their employment and wages in the three communities were estimated. For example, because USDA Forest Service employment is reported only as a county total, the number of Forest Service workers in West Yellowstone was estimated based on information provided by the Gallatin National Forest (USFS 1991)

Available wage and salary employment data understate total employment in an area because they do not include the self-employed. Despite this omission, wage and salary data are the only measure of economic activity available for the variety of communities which make up the impact area.

Analytical Framework

Our main analytical focus was on analyzing tourist expenditures and wages and salaries in tourist industries between 1987 and 1989. As described earlier, we were primarily interested in the differences between what actually happened and what would have occurred had there been no fires. This requires that the actual data be compared to projections which assumed that no fire occurred.

All analyses were conducted in terms of the Yellowstone Fire Impact Area discussed earlier. Similarly, the tourism industry consists of firms classified under the SIC codes discussed earlier. Finally, all analyses were conducted in terms of constant, 1989 dollars, using the Index of Personal Consumption Items for deflation (BEA, 1989).

The analytical framework for calculating impacts of 1988 Yellowstone Fires is shown below.

Actual effect of tourist expenditures on tourism industries (Expression 1)

- Projected effect of tourist expenditures on tourism industries (Expression 2)

= Effect of tourist expenditures on tourism industries

+ Actual effect of ADO payments on tourism industries (Expression 3)

= Effect on tourism industries

+ Actual effect of ADO payment on nontourism industries (Expression 4)

= Direct effect on local industries

x Wages and salary coefficient (Expression 5)

= Direct effect of wages and salary on local industries

x Multiplier (Expression 6)

= Total effect of 1988 Fires of wages and salaries on local economies.

Tourism Related Effects

Actual Effect of Tourist Expenditures on Tourism Industries

The methods used to measure tourism-related impacts are associated with Expressions 1 and 2 of the analytical framework. Expression 1 quantified the actual effect of tourist expenditures on wages and salaries, given that the Fire took place. Expression 2 quantified (projected) the effect that tourist expenditures would have had on wages and salaries, had the Fires not occurred.

Actual Effect of Tourist Expenditures on Tourism Industries

Expression 1 required expenditure information for 1987, 1988 and 1989. Data required to estimate gross expenditures for the with-fire effects followed the methodology developed for non-resident travel in Montana (Moisey and Yuan 1989). This methodology was based on the expression:

$$ATE = TOE + TIE$$

where ATE is actual tourism expenditures in the greater Yellowstone area,

where TOE is total gross expenditures by tourists outside Yellowstone Park, for

$$TOE = \sum_{c=1}^{5} ((PT)s(T/GS)) \times ((DO)(F+T+O) + (NO)(L))$$

C = Communities of Jackson, Cody, West Yellowstone, Gardiner and Silver Gate/Cooke City
PT = Percent of visitation through the community as measured by NPS entrance counts
T = Total visitors to Yellowstone N.P. between July through September
GS = Group size
DO = Length of stay in days outside the Park
F = Average daily expenditure for food
T = Average daily expenditure for travel
O = Average daily expenditure for other expenses
NO = Length of stay in nights outside the Park
L = Average daily expenditure for lodging

where

TIE is total gross expenditures by tourists inside Yellowstone Park, for

$$TIE = (T/GS) \times ((DI)(F+T+O)) + (NI \times L))$$

DI = Length of stay in days inside the Park
NI = Length of stay in nights inside the Park

The model above required four types of data: (1) total number of travelers to the affected area; (2) the average number of days and nights spent per group while in Montana (travel and expenditure information are obtained for groups); (3) the average daily expenditures per group for lodging, travel, food and miscellaneous; and (4) group size.

Numerous data sources were examined to identify the most valid and reliable for estimating tourism-related effects. To determine which data sources were the most useful, personal interviews were conducted with many of the major private and public-travel providers in the Yellowstone National Park area. We contacted officials from: (1) the Bridger-Teton and Targhee National Forests and Grand Teton and Yellowstone National Parks; (2) local community officials and chamber of commerce; (3) major lodging, food service; (4) recreation and tourism related retail establishments; and (5) park-based concessionaires. Interviews provided anecdotal accounts useful in checking the overall validity of results from the subsequent analyses. A major effort was taken to secure information to estimate impacts from concessionaires inside Yellowstone National Park. Franchise fees paid by the concessionaires were obtained and used as a validity check against the estimates produced by the study.

1987 pre-fire tourism expenditures were identified through data from the 1987 Visitor Services Project (VSP 1987) which studied Yellowstone National Park visitors and their overall level of expenditures. Visitors kept detailed itineraries for three days of their stay inside and outside of the Park. Visitors recorded the location of each night's lodging, group size, and activity.

Data from the Montana Travel Surveys were used to determine 1988 tourism expenditures (Yuan and McCool 1988; Yuan and McCool 1989). Visitors were interviewed at survey sites close to Gardiner, West Yellowstone, and Red Lodge during the 1988 Fires. Expenditure data were based on two days of travel and included information on type and location of expenditures, length of stay, and group size.

1989 post-fire tourism expenditures were derived from data collected in the 1989 Visitor Services Project (VSP 1989). That project collected information on length of stay, group size,

location of lodging, and other travel characteristics. No primary expenditure information from Yellowstone National Park visitors was collected during the 1989 summer season. However, expenditure estimates were calculated from several secondary sources. For example, an accommodation tax is required of all visitors staying at lodging facilities in Montana. Those taxes reflect total expenditures in each area (Yuan and McCool 1989). Gross expenditures were calculated based on the proportion of accommodation taxes received in 1989 as compared to 1988 base data (ITRR 1989), about a nine percent increase. Based on an inflation rate of about 5,0 percent (WEFA 1989), the amount of real growth between 1988 and 1989 was about four percent. Hence, 1989 expenditures were estimated by increasing 1988 expenditures by four percent. Another source of secondary data was the amount of resort taxes collected in West Yellowstone (MDOC 1989). Those taxes were compared with base year tax data to provide a validity check of the magnitude of changes obtained from the state accommodation tax. Resort taxes increased about ten percent between 1988 and 1989, thereby validating the accommodation tax increase.

For each study year, the number of visitors to the Park and the percentage entering from each community were obtained from: (1) Yellowstone National Park visitation statistics (NPS 1990), (2) highway traffic counts from the Montana Department of Highways (MDOT 1990), and (3) vehicle counts at selected highways (Moisey and Yuan 1989).

The above data sources were used to estimate the effects in Expression 1. Actual tourism expenditures (ATE) for each year were determined by summing the estimated total outside expenditures (TOE) and the total inside expenditures (TIE).

Projected Effect of Tourist Expenditures on Tourism Industries

Expression 2 estimated the projected effect of tourist expenditures on wages and salaries in the tourism industries, as if the Fire did not occur. Two basic assumptions were made: (1) visitor characteristics (length of stay, group size and average daily expenditures) stayed constant between for the with-fire and without-fire years; and, (2) Yellowstone Park visitation would have changed as a result of on-going travel trends in Montana and the United States. We have found that visitation

is the primary variable that determines the magnitude of economic impacts thus our without-fire projections are based on determining potential visitation rates.

Expression 2 also used the methodology developed for non-resident travel in Montana (Moisey and Yuan 1989):

PTE = PTOE + PTIE

... where PTE is projected tourism expenditures in the greater Yellowstone area,

... where PTOE is projected total gross expenditures by tourists outside Yellowstone Park, for

$$PTOE = \sum_{c=1}^{5} ((PT)s(TV/GS))\ ((DO)(F+T+O) + (NO)(L))$$

TV = Total visitors to Yellowstone N.P. between July through September

Other variables are as before

... where PTIE is projected total gross expenditures by tourists inside Yellowstone Park, for

PTIE = (T/GS) ((DI)(F+T+O) + (NI)(L))

DI = Length of stay in days inside the Park

NI = Length of stay in nights inside the Park

To estimate the with-fire effects on tourist expenditures in Expression 2, we estimated the number of visitors to Yellowstone National Park, as if the Fire had not occurred (TV). Multiple regression analysis was used. Time series information on Yellowstone visitation since 1971 (NPS 1990) was used to describe the dependent variable, third quarter park visits. A variety of potential independent variables were evaluated for inclusion in the prediction model. This evaluation was conducted using the "all possible" regression procedure of MINITAB software (Minitab 1988). The best models were identified on the basis of high adjusted R^2 and Mallow's C-p (Draper and Smith 1981). Four models identified were acceptable, with adjusted R^2s ranging from 84.0 to 97.4 percent. These models contained combinations of the following variables:

1. Visitation to Big Horn National Recreation Area (NPS 1990);

2) Non-resident visitation to Montana (ITRR 1989);

3) U.S. Forest Service RIMS visitation data (USFS, 19??); and

4) Travel activity in the U.S. (US Travel Data Center, 19??).

All models indicated similar, though not identical, projections of increasing visitation for Yellowstone National Park between 1988 and 1990. Because we had no subjective basis to choose among these models, we chose the model with the highest R^2 to derive our visitation projections for the years 1988 to 1990.

When the projected number of visitors (TV) was known, it was entered into the Expression 2 methodology. Except for projected visitation levels, all other data used in projections were the same as used in the Expression 1 model. Actual tourism expenditures (PATE) for each year were determined by summing the estimated total outside expenditures (PTOE) and the total inside expenditures (PTIE).

Actual Effect of ADO Payments on Area Industries

Emergency fire fighting needs were met by specially assembled administrative units which made onsite purchases of needed materials and services. Most expenditures were paid by checks on the U.S. Treasury written by Assistant Disbursement Officers (ADO). ADO teams from both the USDA Forest Service and USDI National Park Service were assigned to the Yellowstone Fires. Additionally, there were payments made from special funds ("impressed funds") maintained in the Supervisor's Office of the various national forests.

The economic impact of ADO payments is similar to tourist expenditures because they are purchases of goods and services from persons and establishments. ADO payments may be partitioned into three components.

ADO = NONLOCAL + (TOURIST + NONTOURIST)

where

ADO = total ADO expenditures

NONLOCAL = ADO expenditures to businesses and individuals outside the Yellowstone Fire Impact Area. They are discussed further in Section ___ .

TOURIST = ADO payment to tourist businesses in the Yellowstone Fire Impact Area, it is

required in Expression 3 of the analytical framework.

NONTOURIST = ADO payment to nontourist businesses and individuals in the Yellowstone Fire Impact Area, as required in Expression 4 of the analytical framework.

To estimate the three components, individual ADO payment records were examined to determine the payee's location (Yellowstone Fire Impact Area versus elsewhere) and industry (tourist versus nontourist). The records for the NPS ADO teams were obtained from the University of Wyoming (Phillips 19??). The U.S. Forest Service ADO records were acquired only after a time consuming search. The various ADO teams from different USFS Regions and National Forests each maintained their own records depository. Ultimately, the necessary information was provided by Forest Service personnel in the headquarters for the Northern Region in Missoula, Montana, headquarters for the Intermountain Region in Ogden, Utah, and the files for a single Rocky Mountain Region ADO team located in the Shoshone National Forest headquarters in Cody, Wyoming.

Once obtained, ADO records were processed to determine the location and industry of the recipients. First, payments made in the impact area were separated from those outside the area. This was facilitated by the recipient ZIP codes, recorded for each payment. The following ZIP codes corresponding to the impact area:

Geographical Area	ZIP Code
Montana	
Cooke City	59020
Silvergate	59081
Gardiner	59030
West Yellowstone	59758
Wyoming	
Teton County	
Jackson	83001
Moose	83012
Moran	83013
Wilson	83014
Teton Village	83025
Park County	
Cody	82414

Meeteetse	82433
Powell	82440
Ralston	82440
Wapiti	82450
Idaho	
Fremont County	
Ashton	83420
Chester	83421
Island Park	83429
Mack's Inn	83433
Menan	83434
Newdale	83436
Parker	3438
Rexburg	83440
Rigby	83442
St Anthony	83445
Sugar City	83448
Teton City	83451
Teton County	
Driggs	83422
Tetonia	83452
Victor	83455

The next step was to assign an SIC code to each impact area recipient. Most recipients could be classified using: (1) the recipient's name as listed on the ADO payment stub; or (2) telephone directories and phone calls to the Chambers of Commerce. Local officials facilitated classification for most firms with ambiguous names.

There remained a small number of recipients who could not be classified to a SIC industry. For the most part, they were individuals who rented equipment, such as pickup trucks or tractors, to fire fighting units. These recipients were given a special code and their payments were counted. In total, these recipients received about $2.3 million, roughly 21.3 percent of the ADO payments made in the impact area.

The ADO payments extracted from the National Park Service and Forest Service records were summarized by impact area community and SIC code. In most cases, community totals were very close to those reported in a preliminary Forest Service study completed shortly after the Fires (Sorensen 19??). But in several cases, differences were significant; in those cases our data were roughly 1/2 to 1/3 lower than the Forest Service study. Conversations with the Forest Service revealed that other sources of payments (i.e. "impressed funds") were included in that study.

Because of the additional payments, Forest Service totals were judged more complete. Accordingly, we used the Yellowstone Fire Impact Area payment total reported in the Forest Service study and adjusted our ADO estimates accordingly

Available ADO records suggest that all the payments were made onsite, at the time of the Fires. Although the date the check was written was not reported, services were rendered during the July to October period of 1988. Therefore, we assigned all ADO payments to the third quarter of the 1988 calendar year.

Wages and Salary Coefficient

The lack of published economic data for the Yellowstone areas made it difficult to determine the appropriate wages and salary coefficient in Expression 5. Yuan, Moisey and McCool (1989) found that the labor income coefficient for non-resident travel for Montana was about 0.25. No other sources for wages and salary coefficients for the area were available. But because the Yellowstone Fire Impact Area is a smaller regional economy than the state, the 0.25 figure would probably over-estimate actual impacts. In light of that judgment, we used a more conservative labor income coefficient of 0.20 for the Yellowstone area.

Multipliers

Expression 6 of the analytical framework applied a multiplier to estimate total economic effects. Information on how fire-related events affected the local economies would not be complete if those primary impacts were not expanded to the total by including secondary impacts. Rather than estimating multipliers for the Yellowstone Fires Economic Impact Area, which is a sizable project requiring resources well beyond those allocated to this study, we have chosen to use the existing RIMS II earnings multipliers developed by the U.S. Bureau of Economic Analysis (BEA 1992). For the sake of convenience, we simply averaged the relevant statewide earnings multipliers for Montana, Idaho, and Wyoming.

RIMS II EARNINGS MULTIPLIERS
Montana, Wyoming, and Idaho

	Montana	Wyoming	Idaho	Average
Retail Trade	1.54	1.44	1.55	1.51
Lodging Places	1.68	1.59	1.71	1.66

The earnings multipliers are defined as the total dollar change in household earnings for each dollar change of earnings of households employed in the industry corresponding to the entry. The RIMS II multipliers probably overstate the effects because they are statewide averages and the impact area is a multi-county region. The degree of overestimation is unknown.

RESULTS

The fires in and around Yellowstone National Park during 1988 had substantial effects on both natural ecosystems and Park visitation. Figure 2 shows that Park visitation dropped markedly three times since 1971. The first occurred shortly after the Organization of Petroleum Exporting Countries was formed and coincides with the first oil embargo. There were long waiting lines at gasoline pumps; gasoline prices soared. The second substantial drop in Park visitation coincides with the second oil embargo. The country was captivated by the hostage crisis in Iran. The third drop occurred in 1988, coinciding with the 1988 Yellowstone Fires. Extrapolating the trend in the years before the Fires, 1988 would probably have been a record year for Yellowstone National Park. Figure 2 also shows that park visitation in the two years following the Fire did not return to the prefire trajectory. The following sections systematically analyze the effects of the 1988 Yellowstone Fires--potential and real, tourism-based and not tourism-based, local and distant.

Description Of Study Area And Communities

The Greater Yellowstone Area--encompasses all the communities in this study, consisting mostly of forested and open lands located in Wyoming, Montana and Idaho. This area is one of the nation's last, largest and mostly intact ecosystems (Rasker 1992). Yellowstone National Park is

the area's primary attraction, being the world's first national park and considered to be the greatest geothermal area in the world. Resource extraction is still important but the service sectors of the economy is where growth is occurring. This growth has produced some stability to the boom and bust cycles of the traditional industries. Tourism is the focus of service sector based growth in the area. Yellowstone National Park has had record visitation each year since 1989. National Forest visitation outside of the Park has also increased.

The following descriptive areas are referred to as communities although they are counties, cities, and unincorporated areas.

Park County, Wyoming--is the largest community in the impact area. Measured using wage and salary employment, Teton County's 9,636 workers accounted for 42.0 percent of total employment for the entire impact area (Table 1). The economy of Park County is heavily dependent on agriculture and oil and gas extraction. Since many farmers and ranchers are self employed, the reported figure of 2.2 percent of wage and salary employment in agriculture underestimates the importance of this industry (Table 1). Oil and gas extraction is classified in mining, which reported 749 workers, representing 7.8 percent of the total. Cody is the major city in the county and is located about fifty miles from the East Portal of Yellowstone National Park. The travel industry accounts for about 15.0 percent of total wage and salary employment (Table 1), and reaches peak levels during the summer tourist season. Park county has a relatively large and diverse economy, as evidenced by the significant numbers of workers in wholesale trade, non lodging services, etc. (Table 1)

Teton County, Wyoming--is the second largest community in the impact area. The 9,341 wage and salary workers represent 40.7 percent of the impact area total. Jackson is about 30 miles south of Yellowstone National Park and is the major city (see Figure 1) in the county. It is the center of a summer and winter recreation area. Most of the summer travelers visit nearby Grand Teton and Yellowstone National Parks, or participate in other forms of outdoor recreation. In the Winter, Jackson is the center for several world class ski and winter recreation resorts. Teton County has a relatively large and diverse economy, with significant employment in wholesale trade,

finance, insurance, and real estate, and other categories (Table 1). The travel industries account for about 36.4 percent of the wage and salary employment, suggesting that it is a major factor affecting the local economy.

West Yellowstone, Montana--is located at the northwestern portal of Yellowstone National Park (see Figure 1). It is an incorporated city in Gallatin County, and is much smaller and 90 miles south of the county seat of Bozeman. The 758 wage and salary employees represent about 3.3 percent of the impact area total (Table 1). West Yellowstone has traditionally had a strong summer travel industry based on visitations to Yellowstone National Park. In recent years, local businesses have attempted to diversify by promoting snowmobiling as a recreation activity. Although it has grown significantly, the level of activity in the winter is still much smaller than in the summer. West Yellowstone does not have a diversified economy. There is relatively little employment in the sectors not serving visitors. The travel industries account for about 54.1 percent of the wage and salary workers (Table 1).

Gardiner, Montana--is an unincorporated community at the northern portal of Yellowstone National Park (Figure 1). It is near the year-round administrative center of the Park at Mammoth, Wyoming. The 375 wage and salary employees represent about 1.6 percent of the impact area total. Most travel activity in Gardiner occurs during the summer, but the effects of the Park workers at Mammoth is felt year-round. A gold mine employing 50 to 100 persons opened near Gardiner in 1989. (It is represented by the D in Table 1--indicating that data for a single firm cannot be released.) Had the mine not opened and the associated exploratory activity not occurred, the travel industries would have accounted for more than the 38.7 percent of wage and salary employment shown in Table 1.

Cooke City and Silvergate, Montana--are two very small unincorporated communities immediately adjacent to the northwestern portal of Yellowstone National Park (Figure 1). Taken together, their employment totaled only 38 workers, less than one half of one percent of the impact area total. These communities are strongly oriented toward travel, with travel-related employment accounting for 86.8 percent of all wage and salary employees. Although a few establishments

remain open year-round and snowmobiling has been established as a winter activity, these communities are strongly oriented toward the summer tourist season.

Teton and Fremont Counties, Idaho--are immediately adjacent to Yellowstone and Grand Teton National Parks. Taken together, they has about 2,815 wage and salary workers, and accounted for roughly 12.2 percent of the impact area total. There are no portals from Yellowstone National Park to these counties. Consequently, although they are contiguous to the Park, they receive relatively little tourist traffic. These counties are primarily oriented toward agriculture and the wood products industry. The travel related categories accounted for only 17.4 percent of employment in Teton County, and 8.6 percent in Fremont County: among the lowest figures among the impact communities.

Tourism Expenditures and Recreation

Actual Effect Of Tourist Expenditures On Tourism Industries

The with-fire effects required estimates of the total number of travelers, the average length of stay, the average daily expenditures, and group size.

Visitation

Yellowstone Park's entrances correspond to the communities evaluated in this study. West Yellowstone traditionally has the greatest number of park visitors, about 34 percent of total (Table 2). The southern entrance (Jackson) is the next busiest, with about 27 percent of total visitation. Total visitation for the study period changed from approximately 2.15 million in 1987 to 1.72 million in the Fire year of 1988, and rebounded to 2.2 million in 1989. Visitation in 1990 rose to 2.4 million, an increase of 9 percent from 1989. The proportion of visitors received by a community stayed fairly constant during the 1987 to 1990 period.

The fires caused few changes in the spatial distribution of visitors, presumably because the Fires were distributed throughout the Park and affected all areas. In 1988, overall visitation went down in all communities, although two communities were affected to a different degree. Gardiner's

proportion of visitors went up from 14 percent to 17 percent while Jackson's went down from 29 percent to 25 percent. The proportion of visitors to the other communities remained relatively stable. Post-fire years showed visitation proportions for Gardiner, Cooke City -Silver Gate, and Cody at about pre-fire levels. However, in 1990 Jackson was about 2 percent lower than pre-fire 1987 while West Yellowstone was about 2 percent higher.

Group Size

The group size of visitors was found to remain constant among communities, averaging about 3.6 people (Table 3). The group size was also found to be the same for inside the Park and outside of the Park. Consistency for group size among communities and inside the Park was probably due to the fact that most groups visited several communities during their Yellowstone trip. Group size changed slightly from a high of 3.7 people per group in 1987 to about 3.6 in 1988 and 3.5 in 1989 and 1990. Overall, the group size of visitors was found to be constant for inside the Park and each affected community outside of the Park. Traditionally, studies have concluded that group size does not have significant fluctuations across short time periods. This study also suggested that the Fire did not have a substantial effect on changing group size.

Length of Stay

The length of stays shown in Table 4 were applied to each community and to inside Park analysis. Total length of stay rose by about 6 percent, from 3.4 days in 1987 to 3.6 during the Fire year and then to 3.7 days in 1989. Similarly, total nights rose from 2.6 nights in 1987 to 2.8 during the Fire year and then to 3.0 in 1989. Days outside the Park increased slightly from 2.0 in 1987 to 2.1 in 1988. Days inside the Park also increased slightly from 1.4 in 1987 to 1.6 in 1989. Nights outside the Park increased slightly from 1.5 in 1987 to 1.7 in 1988. Nights inside the Park also increased slightly from 1.1 in 1987 to 1.3 in 1989. Overall, the Fire did not have a substantial effect on length of stay, these averages remaining fairly constant through the study period.

Average Daily Expenditures -- West Yellowstone had the highest percentage of visitor groups who made an expenditure in a community at 49 percent (Table 5). An expenditure is defined as any purchase of a good or service. This implies that one out of every two groups spent

some money in West Yellowstone. Jackson was a close second with 45 percent. Cooke City/Silver Gate had only 22 percent, suggesting that only about one in every five groups going through these communities spent money. A word of caution: less than half of all visitors made an expenditure in the area and these averages include people who just passed through and did not make any expenditures. These averages do not reflect the cost of of a good or service when an expenditures was made.

The average daily expenditures for each community and for inside the Park is shown in Table 6. Depending on the community, certain recreation industry categories had the greatest expenditures. For example, Gardiner and Cody had the food category as the greatest expenditures. Cooke City/Silvergate had lodging as the highest expenditure while Jackson and West Yellowstone had the other miscellaneous category as the highest. Inside the Park, food was the highest expenditure category. These expenditure patterns reflect each community's tourism dependency and the availability of goods and services for tourism consumption.

West Yellowstone had the highest average daily expenditures among communities, followed by Jackson and Cody. Gardiner and Cooke City/Silvergate had about equal amount of expenditures. These differences may be the result of the larger communities offering more purchasing opportunities. The inside the Park expenditures were consistently greater than the outside of the Park averages. The outside average daily expenditure rose from about $32 in 1987 to about $37 in 1990, a 16 percent increase. The inside average increased from $39 in 1987 to about $44 in 1990, a 13 percent increase. Overall, the average daily expenditures grew at a rate of about 4 percent a year between 1987 and 1990.

Total Gross Expenditures -- The results of the with-fire effects for 1987 was determined by adding the outside Park total of $33.78 million and the inside Park total of $29.68 million to yield a total of $63.46 million (Table 7). 1988 effects were determined by adding the outside Park total of $31.36 million and the inside Park total of $26.82 million, yielding a total of $58.17 million. 1989 effects were estimated by adding the outside Park total of $45.45 million and the inside Park total of $38.74 million, resulting in a total of $84.18 million. 1990 effects were determined by adding

the outside Park total of $52.36 million and the inside Park total of $44.52 million to yield a total of $96.89 million.

The proportion of expenditures for inside the park and outside the park remained relatively stable during the study period, with about 54 percent outside and 46 percent inside the park. The total gross expenditures declined by about 8 percent from 1987 to the 1988 fire year. In the year after the Fire, 1989, the total gross expenditures increased by 46 percent over 1988 and then had an additional increase of 15 percent for 1990.

The effects of the Fires in 1988 had different impacts on each community. The communities which had the highest visitation rate had correspondingly high total gross expenditures. West Yellowstone had the highest impact with about 20 percent of the overall total. Jackson had the next highest at about 16 percent, followed by Cody, Gardiner, and Cooke City/Silvergate in that order. Every community showed a decline of total gross expenditures in 1988 over 1987, except Gardiner. Gardiner's increase resulted from its higher overall proportion of visitors in 1988. In 1989, Jackson's proportion of total expenditures increased significantly more than the other communities. Jackson's 1989 increase did not continue through 1990 though as the community's proportions returned to pre-fire 1987 levels. Overall, the Fire in 1988 affected Jackson the most, but the community also had the greatest proportional increase in economic impacts during the post-fire 1989 period.

Projected Effect Of Tourist Expenditures On Tourism Industries

The estimated with-out fire effects required calculation of the projected total number of travelers to Yellowstone National Park as if the Fire did not occur. All other inputs such as length of stay, group size and average daily expenditures were assumed the same as in the with-fire data. The results of these analysis are shown below. Each community's impact was assumed to be the same proportion as the with-fire effects.

Projected Visitation -- The results from the multiple regression included four independent variables, visitation to Big Horn National Recreation Area, non-resident visitation to Montana, U.S.

Forest Service RIMS visitation data, and U.S. travel activity data. This model produced a very high R^2 of 97.4 and a Mallow's C-p of 3.4 suggesting a high level of confidence in the projections. The projected visitation to Yellowstone in 1988, if the Fire did not occur, was estimated to be about 2.338 million, up about 9 percent from actual 1987 visitation of 2.149 million (Table 8). In 1989, visitation would have increased about 8 percent to 2.535 million and in 1990, the increase would have been about 20 percent to 3.04 million visitors. Community level projections were based on the same proportions from the actual visitation levels. These figures show that West Yellowstone had about 34 percent of the visitation followed by Jackson with 28 percent. Cooke City/Silvergate had the smallest proportion at about 5 percent of the visitation.

Comparing projected visitation estimates to actual visitation figures suggests that the actual visitation in 1988 was only about 73 percent of what it might have been without the Fires. In 1989, actual visitation improved to about 87 percent of without fire projections. In 1990, the actual visitation percentage was 79 percent of projected. Examining the figures for actual and projected visitation suggests that the Fire delayed visitation growth by about one year. The 1990 actual visitation is very close to the 1989 projections. Preliminary 1991 actual visitation of 3 million is similar to 1990 projections. It is unknown how long this potential one-year lag in visitation growth will be in effect. The proportion of impacts remained relatively constant across communities for the three years. In addition, the inside and outside Park proportions were the same across the years.

Projected Total Gross Expenditures -- The projected gross expenditures, if the Fire did not occur, are shown in Table 9. In 1988, the outside Park total was about $42.7 million and the inside Park total was $36.5 million for a total projected gross expenditure (TPGE) for the Yellowstone area of $79.28 million. 1989 effects were determined by adding the outside Park total of $52.44 million and the inside Park total of $44.69 million to yield a total of $97.13 million. 1990 effects were determined by adding the outside Park total of $66.32 million and the inside Park total of $56.39 million to yield a total of $122.71 million. For 1989, the Yellowstone area TPGE increased about 23 percent and in 1990, the Yellowstone Fire Impact Area TPGE would've had a 26 percent increase.

Projected impacts differed among communities with 1988 projections showing Gardiner with the greatest increase of 45 percent over 1987. Most other communities would have had about 25 percent increase except for Jackson with about 11 percent. In 1989 though, community growth would have taken a reversal from the previous year with the slow growth communities showing faster growth. In 1990, community growth rates returned to 1988 figures. Because each community's economic impact was based on its visitation, the proportion of impacts remained relatively constant across communities, and inside and outside the park for the three years.

Net Effect Of Tourist Expenditures On Tourism Industries

In terms of gross expenditures, subtracting the projected impact of $79 million in 1988 from the actual impact of $58 million produced a net negative effect from the Fires of about $21 million (Table 10). In other words, the Yellowstone fires in 1988 produced a loss of about $21 million in gross expenditures from what it might have been without the Fires. The 1988 actual economic impact was only 73 percent of the without-fire projection. In the 1989 post-fire year, the projected impact of $97.13 million was subtracted from the actual impact of $84.18 million for a net loss of about $12.9 million dollars of gross expenditures. The 1989 actual economic impact was only 87 percent of the without-fire projection. In 1990, the actual impact of $96.89 million was subtracted from the projected impact of $122.82 million to yield a net loss of about $25. 82 million of gross expenditures. The 1990 actual economic impact was only 79 percent of the without-fire projection. The total net impact between 1988 and 1990 was a loss of about $59.88 million of gross expenditures.

In summary, the Yellowstone fires have produced a net loss of tourism expenditures during each of the years between 1988 and 1990. The magnitude of loss during the post-fire 1989 period was partially offset by an increase in visitation immediately after the fire. It is unknown how long this temporary visitation increase lasted or will last. Even though the economic loss was reduced in 1989, the increase in visitation was not enough to match what the visitation would have been without the fires. Most communities tourism impacts were affected by the same magnitude since the fire

was wide spread throughout the area. It is unknown what the long term impacts will be since the surrounding communities have different levels of dependency on tourism. The more-tourism dependent communities may be the most affected since they do not have the economic diversity to make up for the tourism based loss.

Ado Payments

Separate estimates of the ADO impact area expenditures to (1)tourist industry firms and (2) to other firms were made. As shown in Table 11, the payments to tourist related establishments (eating and drinking, misc. retail, and lodging places) were about $3.3 million, or roughly 30.4 percent of the impact area total. Correspondingly, the total for nontourist firms was about $7.5 million, or 69.6 percent of the total. Approximately $2.2 million, 20.7 percent, of the ADO impact area payments were made to individuals or vendors which could not be classified to an SIC category, but where included in the total for the nontourist industry.

The total expenditures by USFS and NPS ADO teams for the Yellowstone fires were about $33 million. (Sorenson 1988). Roughly $10.8 million of these payments, or about 32.7 percent, were made to vendors in the impact area. (Table 11)

Fremont County (Ashton), Id., was the single largest recipient of ADO payments; these vendors were paid approximately $2.7 million, or roughly 25.0 percent of the impact area total. Fremont county has no direct access to Yellowstone National Park and receives little tourist expenditures (Figure ? and Table ?). In addition, Fremont County accounts for less than ten percent of the impact area employment (table 11).

The ADO payments to the other impact area communities were not closely proportional to their size. Payments in the two largest communities, Park and Teton counties, were $4.8 million, or about 44.4 percent of the impact area total. In contrast, these two communities accounted for approximately 82.5 percent of the impact area employment (Table 1).

A total of about $12.9 million was spent by the ADO teams in Montana, roughly $3.3 million in the Fire Impact Area and about $9.5 million elsewhere in the state--including sizable

amounts in Billings, Missoula, and Helena. (Table 13) In Idaho, approximately $2.3 million was paid to persons and firms outside the Yellowstone Fire Impact Area--with Idaho Falls and Boise being the major recipients. Wyoming communities outside the Fire Impact Area received about #3.8 million in ADO payments--with Greybull, Riverton, and Rock Springs being the largest recipients.

Outside of the immediately adjacent states of Montana, Wyoming, and Idaho, the ADO teams spent about $6.6 million. (Table 13) The two largest recipients were California ($3.8 million) and Oregon ($1.5 million). Nevada, Utah, and Washington each received between $0.1 and $0.4 million. The ADO payments to all other states were less than $100,000.

West Yellowstone received $2.2 million in ADO payments, about 27.2 percent, while its share of the impact area employment was 3.3 percent. The ADO payments for Gardiner were approximately $1.0 million, about 11.9 percent, and for Cooke-City Silvergate $0.2 million, or approximately 2.1 percent. percent. In both communities, their share of ADO payments was greater than their employment share.

Employment And Wages

The tourist industry consists of firms in SIC 58 (eating and drinking places), SIC 59 (miscellaneous retail trade), and SIC 70 (lodging places). Short-term trends in this industry are best measured using inflation-adjusted wages rather than employment. Firms are more likely to accommodate short-run fluctuations in demand by adjusting hours worked and wage rates (i.e. overtime) rather than hiring or firing workers.

The impact of the 1988 Yellowstone fires on the tourist industry is more clearly seen in the data for only the third quarter, rather than calendar year figures. For the entire impact area, the 1988 fires had only a barely perceptual impact; annual tourist industry wages increased 8.5 percent from 1987 to 1988, and then 10.4 percent from 1988 to 1989 (Table 12) The third quarter data show the impact much more dramatically, impact area tourist industry wages declined 2.2 percent from 1987 to 1988, and then rebounded with a 6.8 percent rise between 1988 and 1989.

Third quarter data also provide a more precise picture of Fire-related trends in the individual impact communities. For example, five of the seven communities experienced declines from 1987 to 1988, and six of the seven had significant accelerations during 1988-89 (Table 12) The trends are not as distinct in the annual data for these communities--in fact, none of the annual data for the communities show declines in 1988.

The 1988 Yellowstone fires appear to have had different impacts in the various communities. The greatest relative declines in third quarter wages were in Park County, WY (Cody, -7.4 percent), Teton County, Id (-6.1 percent), and West Yellowstone, MT (-5.0 percent). In terms of dollars, the greatest decreases were in Park County, WY ($-302,000) and Teton County, WY ($-159,000)--but these are the two largest communities in the impact area. The communities of Cooke-City Silvergate and Fremont County experienced increases during 1988.

The were also significant differences between the communities in terms of their tourist industry wage growth in 1989. The changes from 1988 to 1989 ranged from +53.0 percent in Gardiner, MT, to -7.0 percent in Fremont County, ID. The rapid growth in Gardiner may have been partially due to the new mine which open in 1989 (Table 12).

The tourist industry in Fremont County, ID, experienced rapid growth in 1988 (21.0 percent), and was the only community to decline (-7.0 percent) in 1989. These trends may have been caused by the ADO payments made locally. This community received about one-quarter of the total ADO payments (Table 12), while only accounting for roughly 10 percent of the impact area's employment.

Integrating Study Results

The Yellowstone fires had obvious effects on tourist visitation and expenditures. The integrated study results area discussed in this section are shown in Table 14. Estimated expenditures in the impact area by visitors to Yellowstone National Park declined from $63.5 million (1989 dollars) in 1987 to $58.2 million (1989 dollars) in 1988, a decrease of about 8.3

percent. Then, in the two years following the Fires, the trend in tourist expenditures reversed and significant increases were experienced; about 44.7 percent in 1989 and 15.1 percent in 1990.

The impact of the Fires can be computed by comparing the actual tourist expenditures to the level of expenditures which would have occurred had there been no fires. In 1988, projected without-fire expenditures would have been about $79.3 million (1989 dollars), approximately $21.1 million (1989 dollars) more than the actual . In other words, the Yellowstone fires reduced 1988 tourist expenditures by about 26.6 percent.

The fire impacts were not limited to 1988. Tourist expenditures were $12.9 million (1989 dollars) less than expected in 1989, and the deficit was approximately $25.8 million (1989 dollars) in 1989. In other words, despite the rapid increases in tourist expenditures in the years after the Fires, the expenditures would have been even greater had the Fire not taken place.

The $10.4 million (1989 dollars) in ADO payments in the impact area made up for some of the lost tourist expenditures. Taking account of these ADO purchases, the 1988 expenditure deficit decreases from $21.1 million (1989 dollars) to $10.7 million (1989 dollars).

The ADO payments, however, did not necessarily go to the same establishments that experienced decreased tourist expenditures. Approximately $3.1 million, or 29.6 percent, of the ADO purchases were made at tourist industry firms, while the remaining $7.3 million, or 70.4 percent, went to other firms or individuals. Looking just at the tourist industry, the expenditure deficit was $18.0 million in 1988; while the figures for 1989 and 1990 remained unchanged because no ADO payments were made during these years. In other words, the non tourist sectors of the impact area benefited to about $7.3 million in sales during 1988.

Direct Effect Of Wages And Salary On Local Industries

Two projections for without fire tourist industry wages were computed. The first assumes that tourist industry wages in the impact area increased at the same rate as no fire tourist expenditures. In the long run, there is a close relationship between expenditures and wages in tourist industries. But this relationship may not be as precise in the short-run. A second projection

was computed by assuming that tourist wages in the impact area increased at the same rate as the Montana tourist industry. Presumably, the statewide industry is sufficiently diverse so that it would not be unduly influenced by the 1988 Yellowstone fires.

Assuming that the impact area increased at the same rate as the without fire projected tourist expenditures, the 1988 Yellowstone Fires had an impact of $-5,010,000 on tourist industry wages in 1988, and $-8,891,000 in 1989. In other word, the impact on tourist industry wages was -27.6 percent in 1988 and 45.8 percent in 1989.

Alternatively, if the impact area tourist industry had grown at the same rates as its Montana statewide counterpart, the estimated impact of the 1988 Fires is much smaller and diminishing. Specifically, tourist industry wages would have been $962,000 higher, or 5.3 percent, in 1988, while the corresponding figure would have been $435,000 higher, or 2.2 percent in 1989.

Total Effect Of 1988 Fires Of Wages And Salaries On Local Economies

In order to derive the total impact, the RIMS II multipliers were applied to the tourist industry wage impacts just computed. The RIMS II multipliers require that the computed impacts be allocated to specific industries. It was assumed that the dollar value of the negative impacts were distributed 1/3 and 2/3 between retail trade and the lodging industry--which is approximately equal to the relative importance of wages in these two tourist industry categories.

Using the first estimates of impacts on tourist industry wages (based on the no fire tourist expenditures), total earnings in the impact area would have been $8,399,000 higher in 1988 and $14,315,000 higher in 1989. Alternatively, using the second estimates of tourist industry wage impacts (based on Montana statewide growth trends), total impact area earnings would have been $1,546,000 higher in 1988 and $700,000,000 higher in 1989.

DISCUSSION

How big was the economic impact of the Yellowstone fires?

It depends. Measured in terms of lost tourist expenditures, the 1988 impact was 36.2 percent of what occurred in 1987. In terms of lost tourist industry wastes, the impact was between 5.3 percent and 19.7 percent.

Didn't ADO payments cushion the impact?

Yes, but only during 1988. There were about $10.7 million in ADO payments in the impact area. Taking them into account, reduced the 1988 tourist expenditure deficit to about 18.4 percent. But not all the ADO payment were made to tourist industry firms (the businesses which experienced declines in expenditures). Examining only the tourist industry, they had a net loss of about 31.0 percent in their 1988 expenditures. There was no change in the estimate of tourist industry wages because these figures already include the net effects of the ADO payments.

Did anyone gain from the 1988 fires?

Yes, within the Yellowstone Fires Impact Area, the nontourist industry firms received about $7.3 million in ADO payments, and probably suffered very little, if any decline due to fewer visitations.

Geographically, the Yellowstone Fires Impact Area was a clear loser, while the rest of the nation was a winner. As discussed above, the Impact Area clearly experienced a net loss, although the size and duration of the loss is open to debate. On the other had, the rest of the nation experienced no losses due to decreased visitation, but received almost $23 million in ADO payments plus the wages of fire fighters and the Fire expenses not paid from ADO funds.

How long did the impact last?

At least for a year or more after the Fire. No matter how it is measure (using expenditures or tourist industry wages), the impact area economy has not yet regained levels of activity that

would have occurred had there been no fire. In other words, the gap between actual activity and projected no fire activity has not yet been eliminated. There is conflicting evidence concerning the trend in the gap. Using some measure and under certain assumptions, the difference between actual and no fire activity appears to be growing.

What was not included in the analysis?

Our estimates of the economic impacts of the Yellowstone Fires were primarily restricted to items which are concrete and easy to measure. Among the items we did not consider are the value of fire related-torts. These claims are now being settled. To the extent that these claims result in payments to persons in the Yellowstone Fire Impact Area, they will counterbalance the negative effects estimated earlier. They will, however, be two or three years after the negative impacts were felt.

We have also not estimated the wages paid to fire fighters. For the most part, these persons are housed and fed in camps and staging areas, and do not have a great deal of contact with the local economy. But, these fire-fighters were not totally isolated! They must have made some expenditures locally, if only for a pop or candy bar. To the extent that they did spend locally, the Fire related impact as measured by tourist expenditures is overstated. But the impact as measured by tourist industry wages is unaffected because it already incorporates the net spending changes.

Our analysis did not include the self employed. The descriptions of the local economies and the Fire related impacts measured in terms of lost wages use data for only wage and salary workers. One effect is to understate the importance of agriculture, which consists of many self employed farmers and ranchers, mostly in the Wyoming and Idaho counties. To the extent that there are owner operated tourist related business (with no employees) which experienced fire related losses, the estimated wage impact is understated. The omission of the self-employed has no effect on the estimated expenditure impacts.

What data would have improved the estimates of the Fire related impacts?

The primary data deficiency has been the lack of comprehensive data for sub-county areas. Perhaps because of Yellowstone National Park's geographic location at the intersection of three states, the necessity of dealing with different geographic aggregates has restricted the analysis. Specifically, we have no overall measures of the size of the subcounty economies. We have been able to construct some substitutes (covered workers and wages), but they are far from satisfactory.

Just how big was the local economic impact of the 1988 Yellowstone Fires?

Using standard multipliers which take into account the indirect and induced impacts, total 1988 worker earnings in the impact area were reduced by $1.5 to $8.4 million. In 1989, the corresponding impacts were between $0.701 million and $14.315 million.

We do not have estimates of total worker earning for the impact area because it is a combination of counties, incorporated and unincorporated places. We have, however, constructed estimates of total wages and salaries paid to all workers in the impact area during the third quarter and entire calendar year of 1989. Typically, wages and salaries account for about 80 percent of worker earnings.

We estimated that 1989 impact area wages and salaries were about $98.4 million during the third quarter of 1989, and about $362.6 million for the entire year. We do not have an estimate for 1988, but the 1989 figure at least provides a "ballpark estimate," which should be within 10 percent of the correct figure. Using the 1989 estimate suggests that during the 1988 negative impact were about 1.5 to 8.5 percent of the third quarter activity, and somewhere around 0.4 to 2.3 percent of the year-round figure. In 1989, the impacts were approximately 0.7 to 14 percent of third quarter wages and salaries, and about .2 to 3.9 percent of the annual figure.

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Table 1

Average Annual Employment, 1989
Yellowstone Area Communities

Industry	West Yellowstone, MT Number	Percent of Total	Gardiner, MT Number	Percent of Total	Cooke City Silvergate, MT Number	Percent of Total	Park County, WY (Cody) Number	Percent of Total
Agriculture	0	0.00	0	0.00	0	0.00	209	2.16
Mining	0	0.00	(D)	(D)	0	0.00	749	7.77
Construction	15	1.97	(D)	(D)	(D)	(D)	710	7.37
Manufacturing	(D)	(D)	(D)	(D)	0	0.00	377	3.91
Trans., Comm., U.	13	1.72	25	6.66	0	0.00	419	4.35
Wholesale trade	(D)	(D)	(D)	(D)	0	0.00	396	4.11
Retail trade	346	45.65	145	38.93	13	34.21	1,708	17.73
Eating & drinking places	165	21.76	92	24.53	11	28.95	568	5.89
Selected misc. retail	32[1]	4.22	6[1]	3.47			74[1]	0.77
FIRE	16	2.11	7	0.00	(D)	(D)	286	2.97
Services	265	34.96	51	13.60	22	57.89	1,952	20.26
Lodging places	213	28.10	40	10.67	22	57.89	808	8.39
Government	86	11.35	53	14.13	1	2.63	2,830	29.37
TOTAL	758	100.00	375	100.00	38	100.00	9,636	100.00

Industry	Teton County, WY (Jackson) Number	Percent of Total	Teton County, ID (Driggs) Number	Percent of Total	Fremont County, ID (Ashton) Number	Percent of Total	TOTAL All Areas Number	Percent of Total
Agriculture	50	5.35	39	6.24	83	3.79	381	1.65
Mining	3	0.03	0	0.00	36	1.65	837	3.64
Construction	924	9.89	32	5.12			1,721	7.49
Manufacturing	218	2.33	21	3.36	250	11.44	872	3.80
Trans., Comm., U.	260	2.78	7	1.12	94	4.30	818	3.56
Wholesale trade	137	1.47	19	3.04	229	10.48	805	3.51
Retail trade	2,455	26.28	158	25.28	344	15.74	5,170	22.51
Eating & drinking places	1,119	11.98	60	9.60	101	4.62	2,115	9.21
Selected misc. retail	206[1]	2.21	10[2]	1.60	27[3]	1.24	363	1.58
FIRE	448	4.80	20	3.20	43	1.97	813	3.54
Services	3,643	39.00	83	13.28	226	10.34	6,242	27.18
Lodging places	2,072	22.18	40	6.40	61	2.79	3,256	14.18
Government	1,203	12.88	252	40.22	879	40.32	5,304	23.10
TOTAL	9,341	100.00	631	100.00	2,184	100.00	22,963	100.00

(D) Not Shown to avoid disclosures of confidential information.
[1] Includes drug stores (SIC 5912), sporting goods stores (SIC 5941), book stores (SIC 5942), and souvenir stores (SIC 5947).
[2] Includes all industries in footnote 1, plus general merchandise (SIC 53).
[3] Includes All miscellaneous retail establishments (SIC 59)

Table 2

Number of visitors to Yellowstone National Park from area communities, period June through September, in thousands

Year	Gardiner	Cooke City - Silver Gate	Cody	Jackson	West YS	Period Total
1987	309.2	120.3	398.7	614.8	705.9	2,149.0
% of total	14	6	19	29	33	
1988	283.2	91.2	332.3	431.0	577.9	1,715.9
% of total	17	5	19	25	34	
1989	311.2	123.2	402.8	651.5	708.2	2,197.1
% of total	14	6	18	30	32	
1990	338.0	128.2	444.4	658.2	831.8	2,400. 7
% of total	14	5	19	27	35	

Table 3

Group size of visitors to Yellowstone National Park from area communities. period June through September

Year	Gardiner	Cooke City - Silver Gate	Cody	Jackson	West YS	Inside YNP
1987	3.7 people	3.7 people	3.7 people	3.7 people	3.7 people	3.7 people
1988	3.6	3.6	3.6	3.6	3.6	3.6
1989	3.5	3.5	3.5	3.5	3.5	3.5
1990	3.5	3.5	3.5	3.5	3.5	3.5

Table.4

Length of stay for visitors inside and outside Yellowstone National Park. Period June through September

Year	Total days in YS area	Total nights in YS area	Days outside of park	Days inside of park	Nights outside of park	Nights inside of park
1987	3.4 days	2.6 nights	2.0 days	1.4 days	1.5 nights	1.1 nights
1988	3.6	2.8	2.1	1.5	1.6	1.2
1989	3.7	3.0	2.1	1.6	1.7	1.3
1990	3.7	3.0	2.1	1.6	1.7	1.3

Table 5

Percent of Visitor Groups Who Made Expenditures in Each Community

Gardiner	Cooke City - Silver Gate	Cody	Jackson	West YS
31	22	32	45	49

Table 6

Average Daily Expenditures for Visitor Groups to Inside Yellowstone National Park and Outside Yellowstone National Park. Period June through September

Year	Gardiner	Cooke City - Silver Gate	Cody	Jackson	West YS	Weighted Outside Average	Inside YNP Average
1987							
Lodging	$7.30	$8.50	$7.30	$8.40	$9.10	8.30	$11.70
Travel	3.00	2.90	3.20	4.60	4.50	4.00	4.60
Food	11.60	7.20	11.00	9.10	9.60	9.90	12.10
Other	5.10	8.20	6.90	10.70	12.20	9.50	10.50
TOTAL	$27.00	$26.80	$28.40	$32.80	$35.40	$31.70	$38.90
1988							
Lodging	$7.80	$9.10	$7.90	$9.00	$9.70	8.80	$12.10
Travel	3.20	3.10	3.40	4.90	4.80	4.20	4.80
Food	12.40	7.70	11.80	9.80	10.30	10.70	12.60
Other	5.50	8.80	7.40	11.50	13.10	10.10	10.90
TOTAL	$28.90	$28.70	$30.50	$35.20	$37.90	$33.80	$40.40
1989							
Lodging	$8.10	$9.50	$8.20	$9.40	$10.20	9.30	$12.70
Travel	3.40	3.30	3.60	5.20	5.00	4.50	5.00
Food	13.00	8.00	12.30	10.30	10.70	11.00	13.10
Other	5.70	9.20	7.70	12.00	13.60	10.70	11.40
TOTAL	$30.30	$30.00	$31.80	$36.90	$39.50	$35.50	$42.20
1990							
Lodging	$8.60	$10.00	$8.60	$9.90	$10.70	9.80	$13.30
Travel	3.60	3.50	3.70	5.40	5.30	4.70	5.20
Food	13.70	8.40	13.00	10.80	11.30	11.60	13.80
Other	6.00	9.70	8.10	12.70	14.40	11.30	11.90
TOTAL	$31.90	$31.60	$33.40	$38.80	$41.70	$37.40	$44.20

Estimates based on average of two days of expenditures in the Yellowstone area

Table 7

Gross Expenditures for Visitors to Inside and Outside Yellowstone National Park, with Fire, Period June through September, in $Millions

Year	Gardiner	Cooke City - Silver Gate	Cody	Jackson	West YS	Outside Average	Inside Average	YS Total
1987	$4.133	$1.580	$5.618	$10.059	$12.385	$33.776	$29.680	$63.457
% of total	7	3	9	16	20	53	47	
1988	$4.420	$1.399	$5.466	$8.233	$11.837	$31.357	$26.816	$58.174
% of total	8	2	9	14	20	54	46	
87 > 88 % Change	107%	89	97	82	96	93	90	92
1989	$5.474	$2.134	$7.468	$14.023	$16.345	$45.446	$38.736	$84.183
% of total	7	3	9	17	19	54	46	
88 > 89 % Change	125%	154	138	172	139	146	145	146
1990	$6.255	$2.336	$8.668	$14.903	$20.199	$52.362	$44.526	$96.889
% of total	6	2	9	15	21	54	46	
89 > 90 % Change	114%	109	116	106	124	115	115	115

Table 8

Projected Number of Visitors to Yellowstone National Park Without Fire, Period June through September 1988 to 1990, in Thousands of Visitors

Year	Gardiner	Cooke City - Silver Gate	Cody	Jackson	West YS	Period Total
Actual 87	309.2	120.3	398.7	614.8	705.9	2,149.0
Proj 88	386.0	124.3	452.8	587.4	787.6	2,338.4
Proj 89	359.1	142.2	464.8	751.7	817.1	2,535.0
Proj 90	428.1	162.4	562.8	833.6	1,053.5	3,040.5

Table 9

Projected Gross Expenditures for Visitors to Inside and Outside Yellowstone National Park Without Fire, Period June through September. in $Millions, 1989 Dollars

Year	Gardiner	Cooke City - Silver Gate	Cody	Jackson	West YS	Outside Average	Inside Average	YS Total
1988	6.024	1.907	7.450	11.220	16.132	42.735	36.545	79.280
% TOTAL	7	2	9	15	20	54	46	
87 > 88	145%	120	132	111	129	126	122	124
1989	6.206	2.462	8.617	16.180	18.859	52.436	44.693	97.130
% TOTAL	7	2	9	16	20	54	46	
89 > 90	103%	129	116	144	117	123	122	123
1990	7.922	2.958	10.978	18.876	25.583	66.318	56.394	122.712
% TOTAL	7	2	9	16	20	54	46	
89 > 90	128%	120	127	117	136	126	126	126

Table 10

Difference Between Projected and Actual Gross Expenditures of Visitors to Yellowstone National Park Without Fire, Period June through September, in $Millions, 1989 Dollars

Year	Gardiner	Cooke City - Silver Gate	Cody	Jackson	West YS	Outside Average	Inside Average	YS Total
1988A	$4.420	$1.399	$5.466	$8.233	$11.837	$31.357	$26.816	$58.174
1988P	6.024	1.907	7.450	11.220	16.132	42.735	36.545	79.280
DIFF	-1.603	-.507	-1.983	-2.987	-4.294	-11.377	-9.729	-21.106
1989A	5.474	2.134	7.468	14.023	16.345	45.446	38.736	84.183
1989P	6.206	2.462	8.617	16.180	18.859	52.436	44.693	97.130
DIFF	-.731	-.328	-1.148	-2.156	-2.513	-6.989	-5.957	-12.946
1990A	6.255	2.336	8.668	14.903	20.199	52.362	44.526	96.889
1990P	7.922	2.958	10.978	18.876	25.583	66.318	56.394	122.712
DIFF	-1.667	-.622	-2.310	-3.972	-5.383	-13.955	-11.867	-25.823

Table 11

Estimated Assistant Disbursement Office (ADO) Payments
By Industry and Community
1988

Services	West YS	Gardiner	Cooke	Cody	Jackson	Ashton	Driggs	All Areas
Agriculture/Mining	$0	$0	$0	$0	$110,302	$0	$0	$110,302
Construction	3,998	1,941	36,911	334,357	377,207			
Manufacturing	66,146	11,292	191,535	7,571	276,543			
Trans., Comm., U.	88,347	342,282	756,134	102,048	10,514	1,299,325		
Wholesale trade	100,172	38,862	8,396	64,228	0	211,658		
Retail trade	709,592	269,627	19,997	124,581	786,424	811,001	35	2,721,257
Eating & drinking places	366,845	89,568	8,102	43,188	122,929	127,662	35	758,293
Selected misc. retail	62,523	22,383	0	23,137	85,704	2,525	0	196,308
FIRE								
Services	1,105,929	510,590	74,727	649,377	807,515	171,645	18,580	3,338,363
Lodging places	989,682	235,775	53,288	404,194	394,377	162,196	0	2,239,512
Government	41,080	24,455	479	57,494	112,686	9,287	7,579	253,061
All other Individual	151,033	105,925	71,137	794,766	48,732	999,173	10,975	2,236,741
TOTAL	$2,200,153	$965,596	$168,281	$2,110,418	$2,641,482	$2,683,274	$55,255	$10,824,459

Table 12

Wages and Salaries in the Tourist Industry
Yellowstone Area Communities
1989

County	Thousands of 1989 Dollars 1987	1988	1989	Percent Change 1982-88	1988-89
West Yellowstone					
Annual	$ 3,024	$ 3,131	$ 3,662	3.5	16.9
Third Quarter	1,229	1,167	1,378	-5.0	18.0
Gardiner, MT					
Annual	552	696	868	26.1	24.6
Third Quarter	223	213	325	-4.7	53.0
Cooke City-Silvergate, MT					
Annual	141	181	220	28.7	21.2
Third Quarter	85	99	127	15.4	28.0
Park County, WY (Cody)					
Annual	9,974	10,056	10,591	0.8	5.3
Third Quarter	4,070	3,768	4,011	-7.4	6.4
Teton County, WY (Jackson)					
Annual	27,602	30,733	34,175	11.0	11.2
Third Quarter	12,303	12,144	12,815*	-1.7	5.5
Teton County, ID (Driggs)					
Annual	578	597	716	3.2	19.9
Third Quarter	200	188	274	-6.1	45.4
Fremont County, ID (Ashton)					
Annual	1,074	1,289	1,317	20.0	2.1
Third Quarter	454	550	512	21.0	-7.0
TOTAL all areas					
Annual	$43,006	$46,684	$51,548	8.5	10.4
Third Quarter	$18,505	$18,159	$19,392	-2.2	6.8

* Estimated by the Authors

Sources: Montana Department of Labor and Industry, Idaho Department of Employment, Wyoming Department of Employment. (table 2),

Table 13
ADO Payments By State and Major City - 1988

	Payments X $1,000	Percent of Total
Total, all States	$33,088	100.0
Montana	12,856	38.9
Impact Area Community	3,334	10.1
Billings	743	2.2
Bozeman-Belgrade	2,162	6.5
Missoula	1,676	5.1
Helena	581	1.8
Idaho	5,039	15.2
Impact Area Community	2,739	8.3
Idaho Falls	1,663	5.0
Boise	21	--[b]
Wyoming	8,514	25.7
Impact Area Community	4,752	14.6
Greyball	728	2.2
Riverton	598	0.2
Gillette	111	0.3
Rock Springs	136	0.4
Alabama	--[a]	--[b]
Arizona	36	0.1
Arkansas	--[a]	--[b]
California	3,810	11.5
Orange	2,098	6.3
Colorado	39	0.1
Connecticut	--[a]	--[b]
District of Columbia	1	--[b]
Florida	--[a]	--[b]
Georgia	1	--[b]
Illinois	3	--[b]
Indiana	$ --[a]	--[b]
Iowa	3	--[b]
Kansas	--[a]	--[b]
Maine	--[a]	--[b]
Massachusetts	1	--[b]
Michigan	12	0.4
Minnesota	96	0.3
Mississippi	1	--[b]
Missouri	14	--[b]
North Carolina	1	--[b]
North Dakota	1	--[b]
Nebraska	1	--[b]
New Jersey	1	--[b]
New Mexico	61	0.2
Nevada	346	1.0
Reno	256	0.8
Ohio	1	--[b]
Oklahoma	14	--[b]
Oregon	1,525	4.6
New Port	385	1.2
Klamath Falls	650	2.0
Pennsylvania	2	--[b]
South Dakota	28	0.1
Tennessee	--[a]	--[b]
Texas	5	--[b]
Utah	291	0.9
Salt Lake City	178	0.5
Washington	385	1.2
Goldendale	137	0.4

[a] Less than $1,000 [b] Less than 0.1 percent Sources: Sorenson (1988) and the authors

Table 14
Summary of economic impacts Yellowstone impact area

TOURIST EXPENDITURES
(thousands of 1989 dollars)

	1987	1988	1989	1990
ACTUAL	$63,500	$58,170	$84,180	$96,889
PROJECTED (NO FIRE)	N/A	79,270	97,120	122,712
EXPENDITURE DEFICIT	N/A	$-21,100	$-12,940	$-25,823

ADO PAYMENTS
(thousands of 1989 dollars)

	1987	1988	1989	1990
Total	N/A	$10,368	N/A	N/A
Tourist industry establishments	N/A	3,066	N/A	N/A
Other establishments	N/A	7,302	N/A	N/A
ADJUSTED EXPENDITURE DEFICIT	N/A	$-10,732	$-12,940	$-25,823
Tourist industry establishments	N/A	-18,034	-12,940	-25,823
Other establishments	N/A	+ 7,302		

TOURIST INDUSTRY WAGES
(thousands of 1989 dollars)

	1987	1988	1989	1990
ACTUAL	--	$18,565	$18,159	$19,392
PROJECTED (NO FIRE EXPENDITURES)			23,169	28,382
PROJECTED (MONTANA TREND)			19,121	19,827
WAGE DEFICIT (NO FIRE EXPEND)			$-5,010	$-8,891
WAGE DEFICIT (MONTANA TREND)			- 962	-435

Figure 1

Map of Impact Area

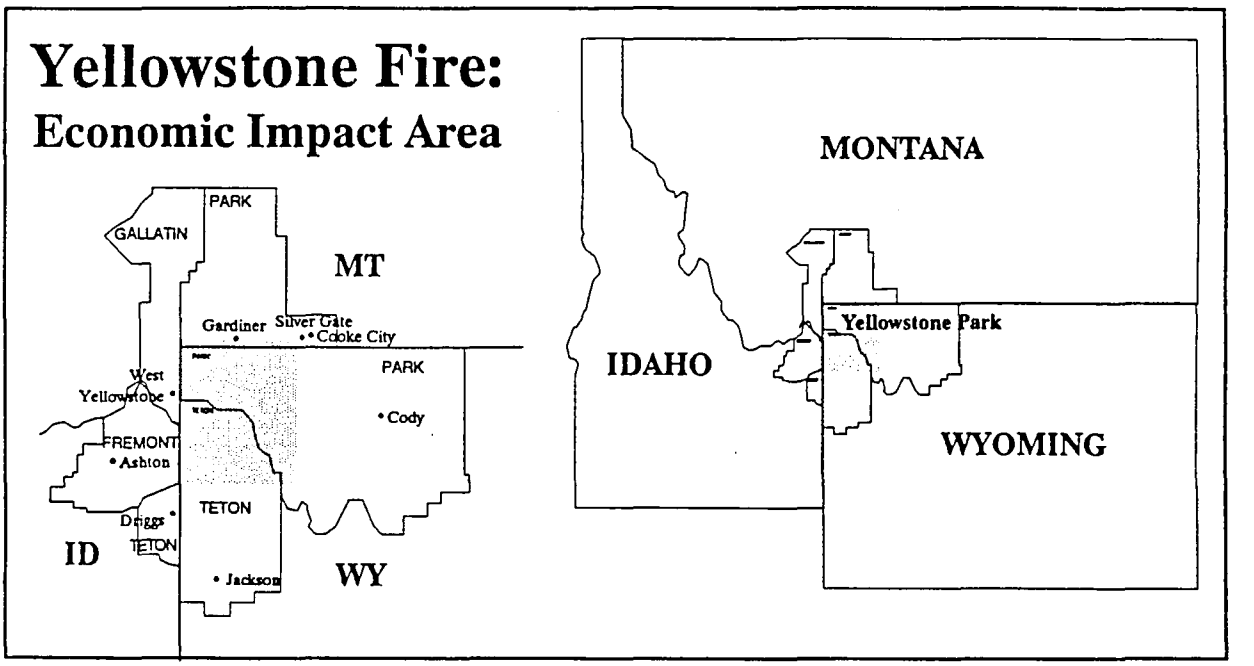

Figure 2

Yellowstone National Park Actual Visitation, in millions of visitors

1971	1.807
1972	1.905
1973	1.756
1974	1.647
1975	1.909
1976	2.146
1977	2.114
1978	2.229
1979	1.610
1980	1.635
1981	2.122
1982	2.009
1983	2.020
1984	1.920
1985	1.884
1986	2.005
1987	2.149
1988	1.715
1989	2.149
1990	2.400
1991	2.950